St. Augustine Orchid Society NEWSLETTER
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Club News

October 3 SAOS Meeting

by Janis Croft
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Welcome and Thanks. Bob Schimmel opened the meeting at 7:00 pm sharp with 54 attendees. Susan Smith introduced our three guests. Bob then thanked Dorianna Borrero, Daisy Thompson and Jeanette Smith for organizing the refreshments and reminded all to drop a dollar in the basket while enjoying their refreshments. Bob stated that the Best of Show voting would occur between the Show Table discussion and the auction and encouraged all to vote for their favorite orchid.

Bob announced the nominating committee (Susan Smith, Linda Stewart and Sue Bottom) who will recommend the 2018 slate of SAOS officers next month. All are encouraged to come and vote.

Club Business. The next and final-for-the-year Ace Repotting Clinic will be Oct. 7 from 9 am til 1 pm.

October shows in Florida include South Florida Orchid Show, Gainesville Orchid Show, Delray Beach Orchid Show and East Everglades Orchid Show, and EFG Orchtoberfest. Check SAOS website for details. Instead of meeting for Keiki club, all were encouraged to attend EFG Orchtoberfest and/or the Gainesville Orchid Show.

Three raffle tickets will now be given to members who exhibit a Show Table plant for their first time. We want you to get comfortable showing your orchids so you'll want to enter them into the Jacksonville Orchid Society Show in March!

The new hats ($15) and T-shirts ($20) were available at the sales table. Email Sue Bottom (info@staugorchidsociety.org) if you need potting supplies and she will bring them to the next meeting for purchase.

Our Membership Veep, Linda Stewart delivered free raffle tickets to the 3 people with birthdays in October.

Remember to email our Club librarian, Penny Halyburton (librarian@staugorchidsociety.org) with your book/DVD your request and she will bring the item(s) to the next meeting. The library collection is listed on our SAOS website.

Show Table Review. Courtney Hackney commented upon how many miniature plants were on display this month and started with the indigo colored Phal (Doritaenopsis) Purple Martin that was described as cute. Most miniature phals like to be mounted or potted with a sphagnum moss base and watered when moss is dry. Grower Linda Stewart said that she waters with rain water with better success at blooming the plant. Next Courtney pointed out the very fragrant Lc Angel Heart 'Hihimanu' with its beautiful pink, white and lavender flowers. The brilliant purple flowered C. labiata is a famous species and appears in the background of many large flowered hybrids. It also is known as announcing autumn, its common blooming time of year. Potinara Hsinying Pink Doll, a mericlone with intense violet and touch of yellow color blooms was impressive. The five Phal. Samera plants, a cross of the coerulea forms of Phal. bellina and Phal. violacea, demonstrate how two coerulea parents can still produce some standard colored offspring. Courtney invited all to come up to the table to see the numerous miniatures mounted on a wire rack and grown by John Van Brocklin. One plant, Pleurothallis niveoglobula, had beautiful foliage with extremely dwarf intricate flowers that require a close up look also. The Habenaria medusa was on proud display with its wispy outstanding lip, composed of finely dissected, radially arranged fringe reminiscent of

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Club News

Upcoming Orchid Events

October

7 SAOS at Ace Hardware, 9 am til 1 pm
3050 US 1 S in St. Augustine
Repotting and Plant Clinic
10 JOS Meeting, Roundtable, 7 pm
JOS Member Discussion
13-15 South Florida Orchid Society Show
University of Miami Watsco Center
Coral Gables
20-22 Orchtoberbest at EFG Orchids
4265 Marsh Road, Deland 32724
21-22 Gainesville Orchid Society Show
Kanapaha Botanical Garden
27-29 Delray Beach Orchid Society Show
Old School Square Gymnasium
27-29 East Everglades Orchid Society Show
RF Orchids, Homestead

November

7 SAOS Meeting, 7 pm
Epidendrums, Encyclias & Prostheceas
Vern Bloch, Orchid Hobbyist
11-12 Fort Pierce Orchid Society Show
Fort Pierce Shrine Club
14 JOS Meeting, Prepping Orchids, 7 pm
Eric Cavin, JOS

December

5 SAOS Christmas Auction, 6 pm
We're meeting on our normal Tuesday night but at a different location and starting earlier!
Memorial Lutheran Church
3375 US 1 South, St. Aug 32086
10 JOS Christmas Auction, 5:30 pm
Orange Park Country Club
2525 Country Club Blvd, Orange Park

January 2018

We are working on getting Ben Oliveros of Orchid Eros in Hawaii to come up to St. Augustine while he is stateside for the Tamiami Orchid Festival in mid-January. We are tentatively planning to move our meeting date from the first Tuesday to the second Wednesday, January 10th. Save the date!

St. Augustine Orchid Society Organization

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Medusa's head of snakes, from which it gets its name. The plant likes acidic soil and needs a dormant period. Next was the Cyrtorchis arcuata plant which is widespread in African forests but Courtney noted still uncommon in the USA. African orchids are typically all white with slight hints of green. Check out the photos of our show table examples at the end of the newsletter and on the SAOS website

SAOS Program. Dr. Kristen Uthus of New World Orchids in Manchester, Michigan spoke about the small and mighty Japanese orchids. She told us what makes them stand out in a crowd and why Neofinetia falcata may be the easiest of all orchids to grow. Japanese orchids are not typical in the orchid world as they are often collected for their leaves rather than their flowers.

She started working part time at New World Orchids and within two weeks bought the business four years ago. Since then she has traveled to Japan and Asia learning about these unique miniature species. She gave a brief description of the four different Asian orchids.

Sedirea japonica - from Nagoran, Japan. Plants are intermediate growers, very fragrant and now considered to be part of the Phalaenopsis group. They need to dry out between waterings.

Cymbidium species - Shunran, 'Spring Orchid' and Kanran 'Cold Orchid'. These plants are fragrant, need cold exposure in the fall and are known for their variegated leaves.

Dendrobium moniliforme - Choseiran 'long life orchid'. An intermediate to cool grower that needs a coolish dryish winter and has fragrant flowers in spring, that are typically white.

Neofinetia falcata - Furan 'Wind Orchid' or Fuukiran (aka Samurai Orchid or 'Rich and Noble Orchid'), which has now been lumped in with the Vandas. Dr. Uthus continued her presentation primarily discussing this later species.

The Neofinetia falcata with over 2200 varieties are easy to grow because they are heat and cold tolerant (down to mid 30's), like moderate to low light, enjoy drying out between waterings and bloom from late spring to early fall. If grown in high light, the leaf color will be affected as well as the leaf size. The Samurai orchids grew popular 400 years ago when the warriors would collect them and present them to the Shogun (the rich and famous nobles). The warriors would then be rewarded with land, titles or monies depending upon the quality of the plant. The plants defining features are leaves, roots, tsuke (where leaf meets stem) and flowers — listed in order of value to the Japanese.

Furan leaves have six typical shapes: Standard leaf, Bean, Princess, Peacock, Pine needle and Contorted. The Bean with its shorter and fatter leaf shape are compact plants and good bloomers. The Princess has thinner, more petite and variegated leaves. The Peacock leaves point upward and the Pine needle varieties tend to be poor bloomers. She then showed slides of contorted leaves in solid green and variegated forms to demonstrate how the contortion adds beauty to the plant. For aficionados of Neofinetia falcata, the leaves are important in defining the plant's true beauty and resulting value.

Next she showed slides of plants with offset growths forming adjacent to the mother plant. When these babies develop enough roots to support themselves, they can be removed and potted up. The monetary value of these plants is based, in part, on how quickly they reproduce themselves since this is the only reliable manner in which to get new plants of a given form. Those that produce offspring quickly are less expensive than those that take years to reproduce. Flowers are typically white but there are varieties with pink, green and yellow blooms too.

Her final slide was from the Grand Prix exhibition in Tokyo showing a large, fully developed plant with no flowers evident. The value of the winning plant is based on its size, foliage and display pot. The grand winner has a pot design that reflects the plant's look, the plant is elevated using sphagnum moss mount and there are no flowers. If you are the Grand Prix winner, you are awarded a new car and substantial purse. She finished by inviting all to come back to her sales table to carefully look at the leaves again on her various Neofinetia falcatas.

Meeting Conclusion. Harry McElroy announced the Member's Choice Award as Potinara Hsinying Pink Doll grown by Susan Smith. Dianne Batchhelder and Susan Smith closed out the meeting with the raffle. Our thanks to those helpful hands who stayed to move the tables and chairs and clean up the room.

Thanks to Watson Realty and Jeanette Smith for the use of their meeting space at 3505 US 1 South

Club News

November 7 Monthly SAOS Meeting
Epidendrums, Encylias and Prostheceas

Vern Bloch is our featured November speaker. His presentation will focus on the Epidendrum, Encyclia and Prosthechea genera that were originally classified as Epidendrums. Vern will show you how to differentiate between them and provide culture tips on how to grow them. All are members of the cattleya family and their hybrids, have become very popular in recent years. They are easy to grow in Florida, providing us with a wide range of colors and shapes. Vern will be happy to answer questions.

Vern is a retired Navy pilot who first became interested in orchids after leaving the service in 1987. Two years later, Vern, and his wife, Helen, became owners of the Palm Bay Orchid Range and participated in many orchid shows around the state. They sold the nursery in 2004 but continue to do business on a small scale. For the past twenty years, Vern has conducted programs for numerous orchid societies ranging from the Florida Keys to North Carolina.

Bring your flowering orchids to exhibit on the Show Table. Do not be shy, first time exhibitors get 3 free raffle tickets. Vern will be bringing plants for sales table. We will have our normal raffle at the end of the meeting. Friends and guests are always welcome!

American Orchid Society Corner

Webinars this Month:
October 4, 8:30-9:30 pm, Members Only
Judging Pleurothallids – Steve Gonzalez, Judge

October 12, 8:30-9:30 pm, Everyone Invited
Greenhouse Chat Orchid, Q&A - Ron McHatton

Photos of Latest AOS Awards

October Orchids Magazine: request free issue!
Rainwater Harvesting
Saving the Rare Young Palm Orchid
A Visit to Papua, New Guinea
For the Novice: Winter Dormant Orchids

Annual Supplement: The Genus Phalaenopsis

September Keiki Club Cancelled
Due to Damage from Irma

We had planned a Keiki Club get-together in September to provide some guidance on steps you can take to get ready for winter. Alas, Irma intervened and the Schimmels had to cancel the meeting due to damage they sustained in the storm. We have an abundance of suggestions and articles on the cultural pages to help you get started. Feel free to send any questions you may have to info@staugorchidsociety.org.

October Keiki Club – Field Trips
Orchtoberfest at EFG Orchids in Deland
Gainesville Orchid Society Show

Let us know if you are interested in carpooling with others to go to some of the orchid festivals and shows the third weekend of the month. We had sign-up sheets at the meeting. Let us know if you are interested and we'll add your name to the list so you can make arrangements with other interested parties.

Orchtoberfest at EFG, October 20-22. EFG Orchids is a commercial orchid grower, owned by George Hausermann Jr. originally of Chicago and fourth generation orchid grower. Orchids and tropical plants will be offered for sale by EFG. The Hausermann clan will be busy preparing brats, German potato salad and more, including German beer!

Gainesville OS Show, October 21 -22. "Orchids in the Garden" is the theme of the Gainesville Orchid Society Show at Kanapaha Gardens. There will be orchid exhibits, seminars and orchid and plant vendors at the event. Mac's Orchids, Odom's Orchids, Plantio La Orquidea, and Ritter's Tropic 1 Orchids will be offering orchids for sale.

Inspiration

Habenaria Wow's White Fairies

Orchid Questions & Answers

by Sue Bottom,
sbottom15@gmail.com

Q1. I noticed white blobs in the redwood mix this Lycaste is growing in on my bathroom window seat. At first I freaked thinking it was mealybug but upon closer examination the round white things looks like some type of fungal fruiting body?

A1. Could that be snow mold? If you shove your finger an inch or two deep into the mix, is the mix starting to go? The simplest fix is repotting, wash all the potting mix away and pot it up in fresh mix. Redwood bark is great for orchids, but of course, organic matter ultimately breaks down. That doesn't mean you shouldn't use organic materials in your potting mix, it just means use smallish pots so that the plant outgrows the pot a little bit before it starts to go bad.

Q2. I think I may have two plants with Cymbidium Mosaic Virus. The first cattleya seems have symptoms of CymMV. The second cattleya's leaves seem strong but there are four black leaves. Do you think these plants have a virus? If it is a virus, I should destroy or isolate correct?

A2. The first cattleya is almost certainly virused, discard it unless it is very special to you. The second cattleya is probably not virused, the undamaged leaves are too

pristine. Did the leaf blackening happen all at the same time and fast? I suspect either sunburn with secondary infection or some rot from excessive leaf wetness. Perhaps you should remove those severely damaged leaves so you don't have to look at them anymore and let the plant grow, it looks like you have lots of blooms coming. If you start to see black splotching down the road, we can always reevaluate.

Q3. My Bulb. carunculatum 'Magnifico' was repotted last fall. I filled a net pot with lava rock and then put about 1" sphagnum moss on top with some pine bark. It was doing fine until recently, then the leaves started yellowing and dropping. I'm watering every 4th day and the plant gets slightly wet every other morning from misters. Any thing else I can do to save this?

A3. It seems like a root issue, maybe too thick of a layer of potting mix and too deep a container for a bulbo, even with all the lava rock. I'm having good luck with mine on a horizontal plaque and just draping a layer of spanish moss over the roots, though this bulbo is probably too big and tall to grow that way.

So get a shallow basket, wash everything off the plant, and water blast away any paper sheathes. Blast the roots, and decide whether or not they need a hair cut. Use styrofoam peanuts instead of lava rock or nothing at all if you have the right basket and put it in a shadier area and watch it once you see new roots growing, add a handful of mix every week, just a bit. Your big issue will be stabilizing the plant while it is getting reestablished. It may look like Rube Goldberg was at the house.

Fall Preparations

Courtney's Orchid Growing Tips

Gone are the hot days of summer, but the fall season reminds us that it is time to prepare for the coming cold season. Even those of us growing indoors need to begin planning for the changing weather if we grow under lights.

A large number of hobbyists move plants outside once spring takes hold each year, but it is now time to begin moving them back to their winter growing area. Not all orchids need to come inside right away. Phals can be left outside until night temperatures drop below 55 F as long as day temperatures are moderate. Moving phals inside before they receive a week or so where the difference between night and day temperatures are at least 15 degrees F can delay the initiation of spikes. Once spikes emerge, it is a good idea to move them inside and away from pests that love those tasty flower spikes.

Vandaceous orchids are usually considered the most cold-intolerant, but that is not universal. Neofinitia hybrids are often part of hobby collections, especially where there is limited space. They can survive considerable cold since the natural habitat of the parent is on the cold side. Many vandas and ascocendas with Vanda coerulea in the background bloom with brighter color if they are experiencing cool nights. Ideally, however, most strap-leaved vandas don't like it when day temperatures drop below 80 degrees F and nights are below 60 F.

Cattleyas are surprisingly tolerant of cool nights and flower better with brighter colors when nights are cool and days warm.

The most tolerant orchids for cold are Cymbidiums and most flower best when exposed to near frosting temperatures. Once spikes emerge, it is best to avoid extreme cold, but this group of orchids is cold tolerant. Once spikes begin to form buds there is a risk of bud blast, so move Cymbidiums into warmer areas.

Of course, there are many kinds of orchids with all sorts of requirements during this transitional season. If there are plants in your collection that do not bloom or bloom poorly, but grow well there may be special conditions you need to provide. If the non-blooming orchid is a species, there are likely books that can tell you what you need to do to get it to bloom. Hybrids are usually easier to bloom, but often require conditions similar to species in their background.

If you grow in a greenhouse it is time to check heaters and vents to be sure they are working properly. The first cold usually comes when you have the least time to get ready so do it now.

Not only are you planning for cold, but so are many of the pests that cause problems in winter. If you have your orchids outside and plan to move them in, you need to avoid bringing these pests inside too. Dipping orchids in your preferred pesticide, pot and all, is a way to get rid of pests hiding in pots. For me, large roaches are a real problem that plagues me all year long here in Florida. An old friend introduced me to a new product that seems to be working well. The product is Niban Granular Bait which has orthoboric acid as its active ingredient. So far, I have not put it in pots, but on benches alongside pots. There was no sign that it was working at first, but soon large roaches started appearing dead on the greenhouse floor. In addition, there is now little damage to new roots and flower buds. Hopefully, this will continue when the greenhouse is closed in winter.

Note: Dr. Courtney Hackney wrote a monthly column of his orchid growing tips for about 20 years; we are reprinting some you might have missed, this one from October 2012.

How to Grow Fuukuran - The Basics

Courtesy of Tom Velardi, BotanyBoy.com
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These wild forms of N. falcata are naturalized on a plum tree in the author's garden in Fukuoka, Japan.

Neofinetia falcata is an easily grown orchid. In nature it grows on trees or sometimes rocks, and is termed *epiphytic* in habit (literally meaning "a plant growing on the outside of something"). Therefore, they cannot tolerate being planted in soil, but instead require other composts that remain airy and do not break down quickly. They also are very resistant to cold in winter compared to most other epiphytic orchids. They do need a true cool winter rest to flower and grow correctly, but just as important is a long, warm, and moist summer season. *Fuukiran*, being special forms of *N. falcata,* respond to the same basic conditions as the typical wild form of the species.

Let's start with proper planting. The wild forms of *Neofinetia falcata*, known as *fuuran* in Japanese, can be grown like they are in nature, that is, mounted to outside trees in appropriate climates or onto tree fern plaques, any nontoxic wood, or for that matter onto rough stone such a pumice. I grow large ones on inverted clay flower pots very successfully. They can also be grown like their tropical relatives such as *Vanda* and *Ascocentrum*, in clay pots or baskets with little compost. Some people grow them in a typical orchid bark and perlite mix with reasonable success. As long as the growing medium isn't allowed to break down too much or stay continually wet, thus insuring healthy roots, they will grow fine using any of these methods.

Fuukiran, being of such high value, are usually handled with more care, especially in Japan, but also by growers worldwide who have learned traditional growing techniques perfected over the centuries. In short, plants are grown on top of a mound of high quality, long fibered sphagnum moss that is ball shaped and hollow at its core. This ball of moss sits in a pot that allows for maximum air movement around the roots. That, I'm afraid is a really tough thing to imagine if you've never seen it, so I'll have to go into detail about how this ball is made and how to incorporate the plant into it. Repotting them in this manner should be done in late winter, just before they commence their growth cycle. If you repot them at other times you can damage growing root tips and delay proper growth during their growing season. Check out this video to see how to pot them the traditional way.

This lovely Ginsekai is being grown the traditional way - on a mound of long fibered sphagnum moss.

If you do decide to mount your fuukiran onto wood or tree fern, I recommend putting down a thin layer of sphagnum moss over the area of attachment to give the roots a water source between wettings. *Neofinetia* roots do not like to remain wet continuously, especially during their dormancy,

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but they do like a layer of moss to grow onto. I've had good success attaching plants to trees in my yard this way as well. I prefer to use fine fishing line to wire them on since it is strong and difficult to see. Usually within one growing season a new plant will be firmly rooted onto its mount and it time you'll find that individual roots can extend 40 cm (16 inches) or more.

Check out this video of *Neofinetia falcata* and other Japanese orchids growing in my garden in Fukuoka Prefecture in the snow one cold January day.

Roots start growing in spring. These lovely ruby red root tips belong to the purple flowered form, Shutennou.

The next most important issues are temperature and watering. I'll handle them together since they directly influence the plant's happiness synchronously. This species comes from subtropical to warm temperate regions of Japan and Korea that get distinct seasons. In winter it is cool to even cold most of the time with temperatures ranging between 23F to 60F, but these end points mark the extremes. Here in Fukuoka Prefecture a typical day in January will bottom out just above freezing, say 35F and rise to 46F by afternoon. These conditions in no way harm plants, nor are they required for an adequate dormancy, which these plants do require to grow and flower properly. My suggestion is that you drop growing temperatures to at least 50-60F during the winter months (December through mid March), and back off watering so that they don't stay wet very long. If your conditions are humid (above 70%) you shouldn't need to water more than once a week. If you grow inside a house, you may water more, but don't overdo it.

When daylight increases and temperatures rise in April, begin watering more often. Temperatures in the 60-77F range are ideal at this time. You will notice that root tips will begin growing again, and new roots will initiate along the attachment points of the leaf axes. As June comes increase watering, especially if temperatures start to average above 77F. June is the time of the monsoon in Japan, so it is OK to water the plants freely at this point. The best time to water is in early evening. I water daily once the heat kicks in. Also at this time you should start fertilizing the plants once again. Any water soluble fertilizer with micronutrients works well. Ideally they should be fed once a week while in active growth. I use a fairly weak solution, about half normal strength.

By late June (earlier if you grow inside) you will begin to see the flower stalks growing. This is the happy time for a fuukiran grower! Take care when watering as the stalks develop since direct watering onto them can cause them to blast, in particular sensitive plants like *Seikai* and *Unkai*. Also watch for pests at this time. While most of the year pests don't usually cause a problem, flower stalks with their soft new tissues are a delicacy to many bugs. I find that mealy bugs in particular love them and so you must remain vigilant. Avoid any drying at this time to insure that the flowers last as long as possible. The best you can expect is around 2 weeks for most.

After flowering is over I recommend removing any seed pods that have developed. These will only burden the plants. Keep up with watering on a daily basis and routine fertilizing. As temperatures peak you may be forced to add more shading to the growing area. *Neofinetia falcata* are naturally forest dwellers, so direct sun is not good for them. Also, higher heat increases water loss from the leaves, so decreasing light levels at this time along with adequate watering will ensure your plants thrive even during blistering periods. August 2010 was the hottest year on record in Japan. The average temperature for Fukuoka City was 86.5F with highs up to 93-97F daily and nights only down around 79-84F. I was watering my plants to beat the band and they came through with flying colors. While I wouldn't recommend such temperatures, these plants can handle it and even thrive. A good average temperature for summer is between 77F and 82F, but cooler is fine too.

Fall is a time of dropping temperatures, falling light levels,

Tenkeifukurin, an easy to grow fuukiran.

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and decreasing rain. It also is the time when *Neofinetia* initiate their flower stalks for next year, so you need to take care of them correctly. It is said that some growers change their fertilizer to one that favors phosphorus so as to get better blooming. That may indeed work well, but honestly I don't bother. It is important to water plants adequately at this time so that the newly developed flowering shoots stay hydrated and healthy. They are visible in some cases as a very small growth that looks somewhat like a new growth, but is more elongate. Sometimes they remain hidden under the attachment point of the leaf until the next spring, but often you can see a slight bulge.

A closer view of the flowers of 'Manjushage'. In this shot you can see how the spurs curve forward in lovely arcs.

Once true winter hits in late December I dry the plants off quite a bit, keeping them just barely moist. The trick is to keep them hydrated without rotting the roots in the colder conditions. In warmer conditions, say above 60F if you water too much they will break dormancy. Another problem during this time is keeping those new flower stalks alive through the winter. If kept too dry they will die, so don't desiccate the plants and keep the humidity above 50%, with 70% -80% being preferable. At this time it is OK to give the plants more light as well since in their native homes they often grow on deciduous trees and are subject to more sunshine, albeit weak winter sunshine. Also, no fertilizer at this time at all. Wait 'til spring when you see roots starting to grow, then you can begin feeding again.

All in all, I find *fuukiran* easy to grow and flower, in fact they may be the easiest Japanese orchid species to keep. If you use the above information as a guideline, I can almost guarantee you will succeed with these little beauties too.

Some related articles by Botany Boy:
Neofinetia falcata in the "wilds" of Japan
Neofinetia falcata in my Japanese garden
Neofinetia orchid show, fuukiran-ten, part one
Neofinetia orchid show, fuukiran-ten, part two
Fuukiran-odd flower forms
Fuukiran-colored flower forms

Plant Growth Processes

by Sue Bottom, sbottom15@gmail.com

Leaves are the primary energy factories for our orchids, harnessing the energy of the sun to produce food for growth and reproduction. Orchid leaves have a waxy cuticle surface that limits water loss through evaporation. The leaves have stomata on their undersides, adjustable pores that facilitate the entry of carbon dioxide gas into the leaf for photosynthesis but also allow water vapor to exit the leaf in the transpiration process. When the stomata are open, there is a tradeoff between the energy gain from photosynthesis vs. the water loss from transpiration. Orchids have adapted to this photosynthesis/transpiration compromise by modifying their growth processes in response to environmental conditions.

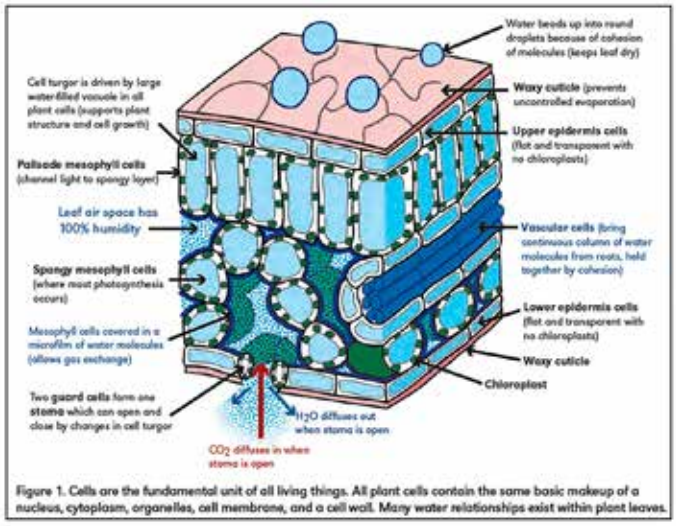

Figure 1. Cells are the fundamental unit of all living things. All plant cells contain the same basic makeup of a nucleus, cytoplasm, organelles, cell membrane, and a cell wall. Many water relationships exist within plant leaves.

Source: Plant Growth Processes: Transpiration, Photosynthesis, and Respiration, University of Nebraska Extension EC1268.

Transpiration. Unlike animals, plants do not have a heart to pump fluid in their vascular system. Water enters the roots, moves up the plant through the xylem and exits through stomata. This process defies the force of gravity by virtue of the capillary forces in the xylem. Transpiration controls essential growth processes.

Evaporative Cooling. Plants transpiring in bright light are able to cool their leaves through evaporative cooling. Water exits the leaves as water vapor in a continuous process as long as the stomata are open. This transformation from the liquid to gas phase has a cooling effect that helps prevent leaf tissues from overheating when growing in direct sunlight.

Carbon Dioxide Absorption. As long as the stomata are open, carbon dioxide is absorbed from the atmosphere for use in the photosynthesis process Plants can close their stomata to limit water loss during periods of drought or high temperature, but this will limit photosynthetic output

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because carbon dioxide cannot enter the leaves with the stomata closed.

Plant Turgor. Like many living things, the majority of plant tissues are comprised of water. The structure of plant tissues requires a certain cellular water pressure to function properly. The water lost through open stomata must be continually replaced to maintain cell turgor.

Nutrient Uptake. Much of the mineral nutrients are absorbed by the roots and distributed throughout the plant via the transpiration process. Calcium uptake in particularly is dependent on a strong transpiration rate.

Photosynthesis is the process by which carbon dioxide absorbed from the atmosphere is transformed into carbohydrates and sugars using light as the energy source. Photosynthesis occurs in the chlorophyll-containing chloroplasts during daylight hours. Depending on the photosynthetic pathway, the stomata are open during the day in some orchids while others are open at night.

C3 Pathway. Thin leaved orchids like many of the oncidiniiae tend to photosynthesize using the C3 pathway. With the stomata open, carbon dioxide is absorbed for photosynthesis and water vapor expelled in the transpiration process. In some plants, in excess of 90% of the water absorbed by the roots is transpired through the leaves. If more water is transpired than can be absorbed by the roots, the plants can decrease the stomatal opening to limit evaporation although this will likewise decrease photosynthetic output.

CAM Pathway. Thick leaved orchids like many in the cattleya alliance and phalaenopsis grow in trees and on rocks with exposed roots subject to dessication during dry periods. These succulent orchids convert light energy to chemical energy using the CAM pathway. They have adapted to their dry xerophytic environment by keeping their stomata closed during the day to prevent water loss, opening at night when the temperatures are lower and humidity higher. Because carbon dioxide can only be absorbed at night, it must be stored chemically in the thick leaf for subsequent use during the day light hours when photosynthesis occurs. CAM orchids tend to have a thicker cuticle and lower density of stomata than C3 orchids.

The CAM adaptation, also used by succulents, benefits the plant by reducing water loss from transpiration but has a substantial energy cost so CAM plants tend to grow more slowly. The degree of succulence is a good indicator of metabolic pathway, with the more succulent orchids more likely to be strong CAM plants. C3 plants have a higher net photosynthesis rate and require much more water to produce a certain amount of biomass than CAM plants.

Most orchid growers probably have both C3 and CAM plants in their collections. Thin-leaved C3 plants start transpiring at sunrise, absorbing carbon dioxide and photosynthesizing, with the stomata open to cool the leaves while absorbing the water and fertilizer we apply in the morning. Strong CAM plants, though, close their stomata during the day so they cannot cool themselves or move as much water and nutrients up through the xylem during the heat of the day. It is important to make sure these plants do not overheat by providing adequate air movement and shading. In extreme heat, you can help keep your plants cool by wetting the surfaces under benches and on the outside of clay pots.

Early morning watering is the consensus recommendation, but during periods of low humidity, transpiration rates are high and water may evaporate so rapidly it is difficult to keep plants hydrated. During these periods, you might consider Courtney's suggestion to water in the late afternoon so the orchid roots stay wet and absorb moisture overnight, particularly those CAM plants that transpire during these hours. In the early morning, you can apply fertilizer (do not apply fertilizer in the evening to avoid fungal issues). Our experience has been that as long as nighttime temperatures are above 60F, the dew point is below 60F and air movement is good, evening watering works.

Respiration is the process by which sugar from photosynthesis and carbohydrate stores are oxidized releasing chemical energy to maintain plant function, fuel plant growth and produce flowers and seeds. This process is the reverse or photosynthesis, requires oxygen and is temperature dependent, occurring more quickly as temperatures increase. The imbalance between carbohydrate production and consumption is most pronounced at night when there is no photosynthesis. If all the photosynthates made by the plant during the day are consumed in cellular respiration, there is just enough energy to maintain the plant, with no extra reserves for new growth, much less for blooming. Lower nighttime temperatures slow down the rate at which reserves are respired, allowing them to be conserved for growth and ultimately flowering.

Orchids have been evolving for millions of years and have adapted to a broad spectrum of environmental conditions. The more we understand how they grow, the better orchid growers we can be. Some simple guidelines: make sure your plants remain adequately hydrated while maintaining an airy environment around the roots. Make sure they get enough of the right kind of light to manufacture carbohydrate reserves. Provide sufficient air movement and shade to prevent overheating during daylight hours. Expose them to cooler nighttime temperatures so there is enough stored energy for blooming. When you see two or more new growths where last year you had only one, you know your orchids are growing well and your floral reward is soon to appear.

Orchid Adventures
North Carolina Arboretum

Planning a trip through the mountains to see the fall colors? If you're close to the Pisgah National forest, stop into the North Carolina Arboretum with 65 acres of cultivated gardens. The Arboretum was established in 1986, nearly a century after Frederick Law Olmsted, the Father of American Landscape Architecture, first envisioned a research arboretum as part of his legacy and plan for George Vanderbilt at Biltmore Estate. These well maintained gardens feature an outstanding bonsai exhibit, pollinator friendly plantings as well as a garden scale model train exhibit all the kids will enjoy.

Show Table

Grower Tom & Dottie Sullivan
Cattleya NOID

Grower Sue Bottom
Habenaria medusa

Grower Bob & Yvonne Schimmel
Eplc. Don Herman

Grower Harry & Celia McElroy
Cym. Chen's Ruby

Grower Suzanne Susko
Den. oligophyllum

Grower Tom & Dottie Sullivan
Lc. Angel Heart 'Hihimanu' AM/AOS

Grower Sue Bottom
C. Caudabec Candy

Show Table

Grower Yvonne & Bob Schimmel
Cne. Green Light

Grower Susan Smith
Pot. Hsinying Pink Doll

Grower Suzanne Susko
Phal. Tassanee Jongdamkerng

Grower Linda Stewart
Phal. Purple Martin

Grower Harry & Celia McElroy
Phal. Samera (6 plants same cross)

Grower Sue Bottom
Soph. cernua x Bc. Star Ruby